REMARKS

I. STATUS OF THE CLAIMS

Claims 1-21 and 23 are currently pending. No claims are amended herein.

II. SECTION 103(a) REJECTION

The Office has maintained the rejection of claims 1-21 under 35 U.S.C. § 103(a) as unpatentable over Matthews et al. (U.S. Patent No. 5,679,220) for the reasons disclosed at pages 2-4 of the September 8, 2004 Final Office Action and pages 2-3 of the January 11, 2005 Advisory Action. Applicant respectfully traverses this rejection for at least the reasons of record and the additional reasons presented below.

The claimed invention, as recited in *e.g.*, claim 1, is directed to a method of continuously producing a product comprising precipitated calcium carbonate. The method comprises continuously delivering an aqueous suspension of a calcium ion source and carbon dioxide into single-pass channel comprising a series of at least two static in-line mixers, and then continuously extracting from the channel precipitated calcium carbonate suspended in an aqueous medium, produced by reaction of the calcium ion source and carbon dioxide in the channel.

For at least the reasons that follow, Applicant's invention is not obvious over Matthews et al. As an initial matter, a *prima facie* case of obviousness requires three basic criteria to be met. M.P.E.P. § 2142. First, the Office must establish that Matthews et al. teaches or suggests all the claim limitations. *See* M.P.E.P. § 2143.03. Second, the Office must establish that some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art,

exists to modify the reference. *See* M.P.E.P. § 2143.01. Finally, the Office must establish a reasonable expectation of success from the required modifications to obtain the claimed invention. *See* M.P.E.P. § 2143.02. In the present case, at a minimum, Matthews et al. does not teach or suggest all the claim limitations nor is there a suggestion or motivation in the art to modify the teachings of Matthews et al.

A. "*static* in-line mixers"

The Office asserts that Matthews et al. discloses "the resulting mixture may then immediately be sent through in-line mixers, such as static in-line mixers. . . ." Final Office Action at 2. Applicant respectfully disagrees with the Office's characterization of Matthews et al. Specifically, Matthews et al. does not expressly or inherently disclose the use of ***static*** in-line mixers, as recited in the pending claims. Matthews et al. merely discloses the possible use of general in-line mixers. Col. 4, lines 58-60, col. 7, lines 35-39.

"In-line mixer" is a much broader term than "static in-line mixer." Applicant submits that the Office has already acknowledged this fact when it used the phrase "such as." Final Office Action at 2. It is well-known in the art that rotary mixers and pumps are common in-line mixers. *See e.g.,* PERRY'S CHEMICAL ENGINEERS' HANDBOOK, 21-57 to 21-59 (6th ed. 1984) (previously submitted). In PERRY'S, static in-line mixers, such as packed tubes, are the last options considered for its discussion of line mixers. *Id.* In addition, when discussing continuous processes, ***static*** in-line mixers are treated as an after-thought. *Id.* at 19-19 to 19-23. Accordingly, Applicant submits that a person of ordinary skill in the art would not believe the disclosure of "in-line mixers" to be an express disclosure of "static in-line mixers."

In addition, Matthews et al. does not provide an inherent disclosure of a static in-line mixer. *Akzo N.V. v. U.S. Int'l Trade Comm.*, 1 U.S.P.Q.2d 1241, 1425 (Fed. Cir. 1986). In *Akzo*, the Federal Circuit affirmed the ITC's determination that the claim, reciting the use of "at least 98% concentrated sulfuric acid," was not invalidated by a reference disclosing the use "sulfuric acid." *Id.* While the term "sulfuric acid" encompasses "at least 98% concentrated sulfuric acid," the evidence established that a person of ordinary skill in the art would not immediately assume "sulfuric acid" meant "at least 98% concentrated sulfuric acid" only that it could mean that. *Id.* Accordingly, as in *Akzo*, the mere disclosure of "in-line mixers" is not enough to render claims to "static in-line mixers" unpatentable.

The Office asserts that *Akzo* is irrelevant to the present facts because "different concentrations of acid . . . may produce different effects or perform different operations. Advisory Action at 2. Applicant respectfully disagrees. First, the alleged distinction raised by the Office was not a factor in the Federal Circuit's decision. Second, the distinction is incorrect. Sulfuric acid, irrespective of the concentration, remains an acidic composition. The concentration determines the ***degree*** to which a given effect or operation is observed on a micro or macro level. The same is also true with in-line mixers. The Office's conclusion that "it is expected that all [in-line mixers] will achieve the desired effect of mixing" is simply incorrect. Advisory Action at 2.

The term "in-line mixer" encompasses a broad variety of mixers, including static in-line mixers. The difference between mixers is largely seen in the ***degree*** of effectiveness of the mixing under the same conditions. Some in-line mixers, like the low concentrations of sulfuric acid, provide minimally observable effects, and some, like the

high concentration sulfuric acid, show immediate and dramatic effects depending on operating conditions. Accordingly, the teachings of *Akzo* remain applicable to these facts and is controlling.

Moreover, there is no motivation provided for a person of ordinary skill in the art to select a static in-line mixer in view of the fact that (1) Matthews et al. teaches that the mere passing of fluid though a tube creates enough turbulence (col. 4, lines 58-60, col. 6, lines 43-45) and (2) PERRY'S teaches that static in-line mixers create significant pressure drop. PERRY'S at 19-22.

The Office asserts that a motivation exists because Perry's identifies the benefits of enhanced heat transfer, uniform residence time, and low power consumption. Advisory Action at 2. Applicant submits that this does not establish a motivation for a person of ordinary skill in the art to modify the teachings of Matthews et al. First, assuming the Office is correct regarding these "benefits," there is no evidence cited by the Office that such "benefits" are relevant to Matthews et al.'s process. Without such evidence of relevance, the "benefits" are meaningless and certainly not a motivating factor to a person of ordinary skill in the art. Second, there is no discussion in Matthews et al. of low power consumption. In fact, PERRY'S explains that power consumption is directly a function of the flow that is forced through the passageways of the static in-line mixer. PERRY'S at 19-22. The more effective the static in-line mixer, the greater the pressure drop and the more power is needed to force the fluid through the mixer.

For at least these reasons, the requisite motivation to modify the teachings of Matthews et al. is not present. *See* M.P.E.P. § 2143.01.

B. "a series of at least two static in-line mixers" and "introducing carbon dioxide into the suspension in the channel at or before each of the mixers."

Applicant also submits that Matthews et al. does not teach the limitation that the "a single-pass channel comprising a series of at least two static in-line mixers," let alone the number of in-line mixers recited in claims 2 and 3 (3 and 4-7, respectively), in combination with "introducing carbon dioxide into the suspension in the channel at or before each of the mixers." While Matthews et al. discloses the possible use of one in-line mixer after all reactants have been combined (col. 4, lines 58-59), there is no teaching or suggestion of more than one in-line mixer paired with the more than one input for carbon dioxide.

At column 7, line 35-42, Matthews et al. outlines different ways to improve the efficiency of the process. The only reference to in-line mixers is with respect to the reaction zone, Reactor 14. This is after the contact zone and, thus after all reactants, including carbon dioxide, has been added. Thus, there is simply no recognition that more than one in-line mixer should be paired with more than one input for carbon dioxide.

The Office's assertion that a motivation to correct this deficiency in Matthews et al. exists because use of more carbon dioxide introduction locations and in-line static mixers has certain alleged advantages (Office Action at 3) is merely conjecture that is not supported by the record. Matthews et al. does teach multiple introductions of carbon dioxide, but only in the contact zone, not the reaction zone, where it teaches the use of an in-line mixer. There is simply no motivation of record to modify this teaching. Specifically, Matthew et al. already teaches that its method, using the reaction zone, is

highly efficient and fully converts the lime slurry. In fact, Matthews et al. teaches that its process is so good, that even in-line mixers or other "aids" are not necessary. Col. 4, lines 59-60, col. 7, lines 41-42. If the process, as taught by Mathews et al., is so good, there is no evidence, except the Office's opinion that a person of ordinary skill in the art would be motivated to modify that process.

C. "non-consumable solids constitute *from 8% to 20%* by weight of the aqueous suspension"

Finally, Applicant submits that Matthews et al. does not teach all of the elements of claim 23, including the one reciting "wherein the non-consumable solids constitute from 8% to 20% by weight of the aqueous suspension of the non-consumable solids in the aqueous medium." Indeed, Matthews et al. teaches that the weight of the fibers may "not [be] greater than about 5%," (col. 4, lines 1-4), and thus, does not teach or suggest this limitation. *See* M.P.E.P. § 2143.03.

Moreover, a person of ordinary skill in the art would recognize that Matthews et al. teaches away from this limitation. *See* M.P.E.P. § 2145 (there is no obviousness, where the prior art teaches away). Specifically, Matthews et al. discloses that an amount in excess of about 5% results in significant deficiencies in the process. Col. 4, lines 4-8 ("Slurry consistencies in excess of about 5% result in lower efficiencies of gas-liquid reaction, hence longer contact times for completion of the formation of the particulate filler and its deposition on the fibers, and therefore are not desired"). Accordingly, a person of ordinary skill in the art would not be motivated to modify Matthews et al.'s teachings. *See* M.P.E.P. § 2143.01.

Since Matthew et al. does not teach or suggest a "static in-line mixer," "a series of at least two static in-line mixers,"and teaches away from "non-consumable solids constitute from 8% to 20% by weight", a prima facie case of obviousness has not been established. M.P.E.P. § 2143. Accordingly, the rejection under Section 103 has been overcome and Applicant respectfully requests it be withdrawn.

III. CONCLUSION

In view of the foregoing remarks, Applicant submits that this claimed invention is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicant therefore respectively requests the Examiner's reconsideration of the application and the timely allowance of the pending claims.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account no. 06-0916.

Respectfully submitted,

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Dated: June 7, 2005

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